

1 Claims

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3 1. Optical module having

- 4 - a circuit carrier (10);
5 - a housed semiconductor element (12) arranged on the
6 circuit carrier (10); and
7 - a lens unit (14; 16, 18, 20; 21) for projecting
8 electromagnetic radiation onto the semiconductor
9 element (12);
10 characterized in that
11 - the lens unit comprises an area (14), supporting the
12 lenses (16, 18, 20; 21), that is an integral
13 component of the housing (13) of the semiconductor
14 element (12).

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16 2. Optical module according to claim 1,

17 characterized in that

18 the area (14) supporting the lenses (16, 18, 20; 21) is
19 preferably formed in one piece with the housing (13),
20 preferably from a thermosetting plastic material.

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22 3. Optical module according to claim 1,

23 characterized in that

24 the area (14) supporting the lenses (16, 18, 20; 21) is
25 preferably formed on the housing (13), for instance in a
26 two-component injection process.

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28 4. Optical module according to claim 3,

29 characterized in that

30 the area (14) supporting the lenses (16, 18, 20; 21)
31 contains thermoplastic material and the housing (13)
32 contains thermosetting material.

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- 1 5. Optical module according to one of the preceding claims,
2 characterized in that
3 the lens unit (14; 16, 18, 20; 21) comprises a plurality
4 of lenses in the form of a package, the lenses (16, 18,
5 20) and where appropriate at least one diaphragm (21)
6 being preferably in direct contact with one another, and
7 the relative positions of the lenses (16, 18, 20) and
8 where appropriate the diaphragm (21) to one another being
9 preferably defined by the geometry of the lenses and/or
10 diaphragm themselves.
- 11
- 12 6. Optical module according to one of the claims 1 to 5,
13 characterized in that
14 just one (20) of the lenses (16, 18, 20; 21) is in direct
15 contact with the lens holder (14), preferably in a
16 watertight and dustproof manner, the methods for
17 attaching the exactly one lens (20) to the lens holder
18 (14) including preferably ultrasound, laser soldering
19 and/or adhesives.
- 20
- 21 7. Optical module according to one of the claims 1 to 5,
22 characterized in that
23 the lenses (16, 18, 20; 21) are snapped into the lens
24 holder (14) by a means of latching (32), the lenses (16,
25 18, 20) or diaphragm (21) preferably having a hard and a
26 soft component for the purpose of forming a watertight
27 and dustproof seal, with the soft component being
28 arranged as a seal in the area of the lenses (16, 18, 20;
29 21).
- 30
- 31 8. Optical module according to one of the claims 1 to 5,
32 characterized in that

1 the lenses (16, 18, 20; 21) are attached in the area (14)
2 supporting the lenses, within the chip housing (13), by
3 means of a retaining element, said retaining element
4 preferably having a hard and a permanently elastic
5 component formed on the area supporting the lens (20) for
6 the purpose of forming a seal and compensating for
7 stress, and said retaining element being joined to its
8 hard component by ultrasound, laser soldering and/or
9 adhesive or riveting methods, or by means of a snap or
10 screw connection to the area (14) supporting the lenses
11 (16, 18, 20, 21).

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13 9. Optical module according to one of the preceding claims,
14 characterized in that
15 pigments are applied to the area (14) supporting the
16 lenses (16, 18, 20; 21), giving rise to a black and/or
17 dull or totally reflective finish, by which means
18 unwanted optical effects, in particular those due to the
19 lateral incidence of light, are prevented.

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21 10. Optical system having an optical module according to one
22 of the preceding claims.

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